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SNOHOMISH WASTEWATER TREATMENT PLANT
CLASS II INSPECTION - SEPTEMBER 20-21, 1992

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by
Paul R. Stasch

Washington State Department of Ecology
Environmental Investigations and Laboratory Services Program
Toxics, Compliance and Ground Water Investigations Section
Olympia WA 98501-7710

Water Body No. WA-07-1020
(Segment No. 03-07-10)

March 1993

TABLE OF CONTENTS

ACKNOWLEDGEMENTS

Many individuals made valuable contributions to the Snohomish Wastewater Treatment Plant, Class II Inspection. Although it is not possible to acknowledge all the participants, I would like to extend a special heartfelt thanks to a few. Marc Heffner's extensive knowledge and years of experience proved invaluable to the success of this inspection. Mike Dawda, the Northwest Regional Office Water Quality engineer, who braved the high seas of the Snohomish lagoon with me in the good ship, H.M.S. "Christina," deserves a unique acknowledgement. Kelly Carruth receives honorable mention for her cheery disposition while she lead me through the mine field of Ecology protocols. And Bill Yake for his rationality and sense of humor.

ABSTRACT

A Class II Inspection was conducted in September 1992 at the City of Snohomish Wastewater Treatment Plant in Snohomish County, Washington. The Snohomish facility is a facultative lagoon system which discharges into the Snohomish River. The inspection data found the Snohomish facility was producing a fairly good effluent quality. Effluent concentrations were within the NPDES permit limitations with the exception of the monthly BOD_5 average concentration. Flow was well within the design criteria specified in the permit but BOD_5 was approaching criteria. Effluent priority pollutant concentrations were generally less than the USEPA Quality Criteria for Water. Two metals, copper and silver, exceeded the freshwater chronic toxicity criteria by a small margin. The bioassays documented little toxicity in the effluent.

INTRODUCTION

A Class II Inspection was conducted at the City of Snohomish Sewage Treatment Plant (STP) on September 21-22, 1992. Conducting the inspection were Marc Heffner and Paul Stasch of the Washington State Department of Ecology (Ecology) Toxics, Compliance and Ground Water Investigations Section of the Environmental Investigations and Laboratory Services Program. Mr. Jeff Ezzy, the treatment plant operator, represented the city of Snohomish and provided assistance onsite. Mike Dawda of the Ecology Northwest Regional Office requested the inspection.

The city of Snohomish operates an unlined, non-aerated facultative lagoon wastewater treatment facility. The influent enters from the headworks located near the northeast corner of the lagoon. The effluent flows through the chlorine contact chamber located adjacent to the southeast corner of the lagoon prior to discharging into the Snohomish River (Figure 1). The discharge is permitted under the NPDES permit (#WA-002954-8) issued on September 14, 1982. The permit expired on September 14, 1987. Ecology is currently renewing the permit. The STP service area has experienced rapid growth, potentially overloading the treatment system.

Specific objectives of the inspection included:

1. Evaluate influent loading to assess plant's remaining capacity;
2. assess the plant's compliance with the effluent limitations of the permit; and
3. assess whole effluent toxicity.

PROCEDURES

Ecology collected grab and composite samples from several stations within the plant. A composite sample of the influent was collected just downstream of the Parshall flume at the headworks. A composite sample of the effluent was collected from the chlorine contact chamber. Ecology Isco composite samplers were used to collect equal volumes of sample every 30 minutes for 24 hours.

Grab samples were collected at the composite sample locations, at several locations within the lagoon, and from marshes adjacent to the lagoon. The lagoon samples were collected from a small plastic dinghy, provided by the Snohomish personnel. A total of four samples were collected, one from each quadrant of the lagoon. Sludges collected at these four locations were composited for the analyses. A grab-composite sample of the effluent was collected for bioassay analysis.

Sample station descriptions are presented in Table 1. Sample locations are depicted on Figure 1. Sampling quality assurance/quality control (QA/QC) steps included priority pollutant cleaning (Appendix A) and maintaining chain-of-custody tracking on all samples; and the submittal of a blind duplicate to the Manchester Laboratory for analyses.

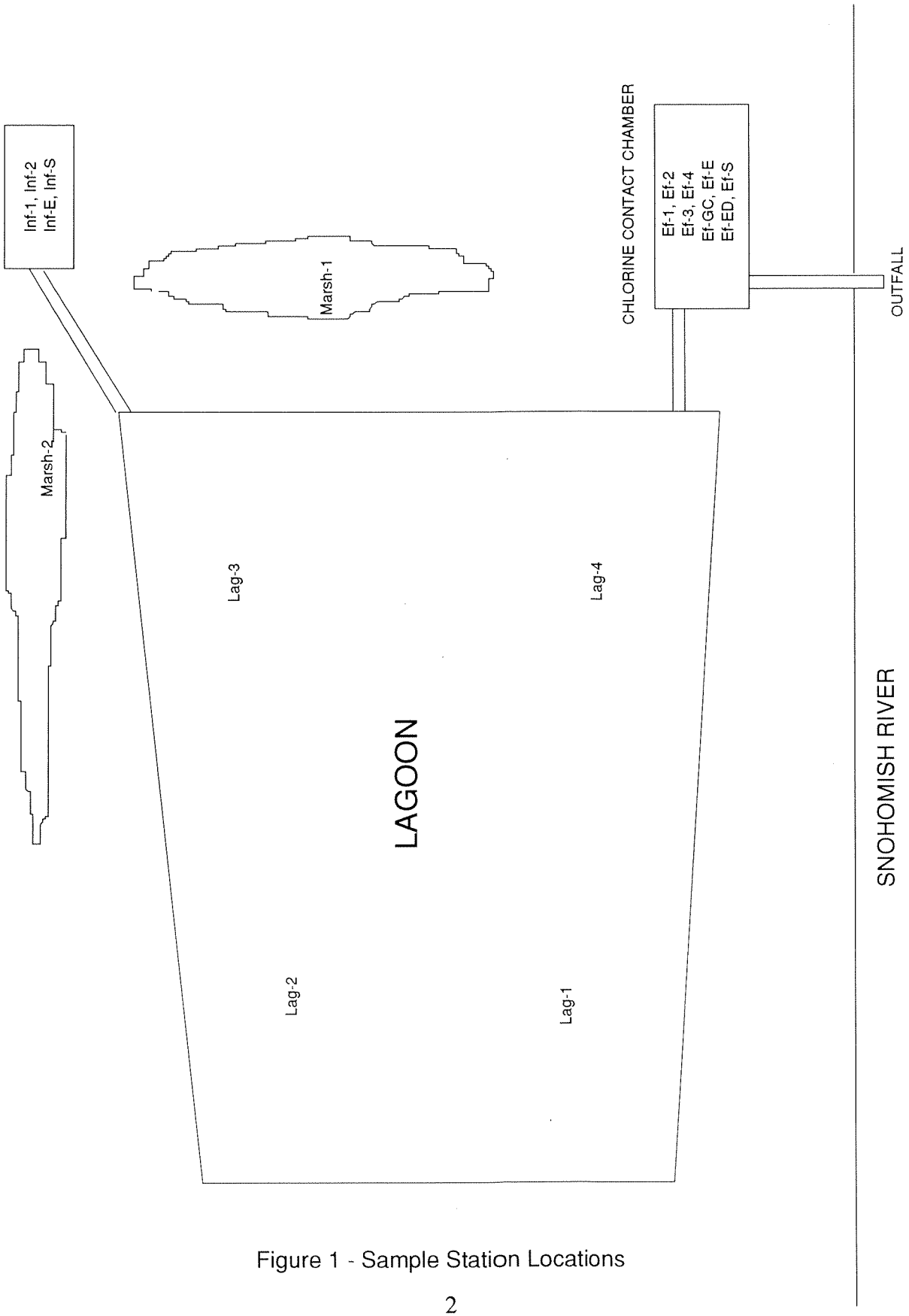

Figure 1 - Sample Station Locations

Table 1 - Sample Station Descriptions

Inf-1,2
Grab samples collected at the headworks of the plant.

Inf-E
Ecology composite sample collected at the headworks of the plant.

Inf-S
Snohomish composite sample collected at the headworks of the plant.

Lag-1
Grab sample collected from the southwest quadrant of the lagoon.

Lag-2
Grab sample collected from the northwest quadrant of the lagoon.

Lag-3
Grab sample collected from the northeast quadrant of the lagoon.

Lag-4
Grab sample collected from the southeast quadrant of the lagoon.

Ef-1-4
Grab samples collected from the chlorine contact chamber.

Ef-GC
Grab-composite sample collected from the chlorine contact chamber.

Ef-E
Ecology composite sample collected from the chlorine contact chamber.

Ef-ED
Duplicate of the Ecology Ef-E composite sample collected from the chlorine contact chamber.

Ef-S
Snohomish composite sample collected from the chlorine contact chamber.

Marsh-1
Grab sample collected from the marsh alone the eastern side of the lagoon.

Marsh-2
Grab sample collected from the marsh alone the northern side of the lagoon.

Sludge
Grab-Composite of an equal volume of lagoon sludge collected from sample stations Lag-1, Lag-2, Lag-3 and Lag-4.

The city of Snohomish also collected influent and effluent composite samples. The Snohomish influent sampler was also to collect equal volumes of sample over a 24-hour period, however, it was noted by Mr. Jeff Ezzy at approximately 1600 hours on September 21 that their compositor was not collecting a sufficient volume of sample. Mr. Ezzy made the appropriate adjustment to the compositor to collect the necessary volume. Ecology and Snohomish samples were split for analysis by both Ecology and Snohomish laboratories. Snohomish contracts BOD_5, TSS, and fecal coliform analytical work to the city of Everett environmental laboratory.

Samples for Ecology analysis were placed on ice and delivered to the Ecology Manchester Laboratory. Samples collected, sampling times, and parameters analyzed are summarized on Table 2.

RESULTS AND DISCUSSION

Flow Measurements

Plant influent flow is measured by a 12-inch flume which was evaluated during the inspection. The flume configuration was acceptable. Ecology made an instantaneous flow measurement for comparison with the Snohomish sonic flow meter measurement. The Ecology and Snohomish flow measurements agreed; the flow rates were 1.47 and 1.4 MGD, respectively.
Effluent flows discharge through a V-notch weir in the chlorine contact chamber. The surface level of the effluent in the contact chamber was approximately 13 feet below the grated cover. Access to the weir was difficult and deemed dangerous, consequently no weir configuration measurements were attempted. Snohomish plans to install a flow meter in the near future.

Quality Assurance/Quality Control (QA/QC)

All Ecology samples were analyzed within the USEPA Contract Laboratory Program holding times. The laboratory data met Ecology QA/QC guidelines, are considered reliable by the Manchester Laboratory personnel and can be used noting the data qualifications included on Table 3.

Results of samples submitted as blind duplicates for Manchester Laboratory analyses were acceptable. All analyses were below 8.1 % relative difference except TNVSS which was 54.5 %. This high relative percent difference in TNVSS is not unexpected given the low concentrations present in this sample.

General Chemistry

BOD_5, TSS, and nutrients (NH_3-N, NO_2+NO_3-N, and Total-P) data indicate Snohomish STP influent is fairly typical of domestic wastewater. Table 3 documents the influent concentrations of these parameters. BOD_5, TSS, NH_3-N, Total-P, and Oil and grease levels were reduced

Table 2 – Sampling Schedule and Parameters Analyzed – Snohomish, 9/92

Parameter	Location:	Inf-1	Inf-2	Inf-E	Inf-S	Lag-1	Lag-2	Lag-3	Lag-4	Ef-1	Ef-2
	Type:	grab	grab	E-comp	S-comp	grab	grab	grab	grab	grab	grab
	Date:	9/21/92	9/21/92	21-22/92	21-22/92	9/21/92	9/21/92	9/21/92	9/21/92	9/21/92	9/21/92
	Time:	1045	1545	----	----	1430	1445	1500	1515	1145	1615
	Lab Log #:	398155	398156	398157	398158	398159	398160	398161	398162	398163	398164
GENERAL CHEMISTRY											
Conductivity		1	1	1	1					1	1
Alkalinity		1	1	1	1					1	1
Hardness		1	1	1	1					1	1
TS				1	1						
TNVS				1	1						
TSS		1	1	1	1	1	1	1	1	1	1
TNVSS				1	1						
% Solids											
% Volatile Solids											
BOD5				1	1						
BOD5 INH											
SOL BOD5											
COD		1	1	1	1					1	1
TOC (water)		1	1	1	1	1	1	1	1	1	1
TOC (soil/sed)											
NH3-N				1	1						
NO2+NO3-N				1	1						
Total-P				1	1						
Oil and Grease (water)		1	1							1	1
F-Coliform MF											
ORGANICS											
VOC (water)		1	1							1	1
VOC (soil/sed)											
BNAs (water)				1							
BNAs (soil/sed)											
Pest/PCB (water)				1							
Pest/PCB (soil/sed)											
METALS											
PP Metals (water)				1							
PP Metals (soil/sed)											
BIOASSAYS											
Salmonid (acute 100%)											
Microtox (acute)											
Ceriodaphnia (chronic)											
Fathead Minnow (chronic)											
FIELD OBSERVATIONS											
Temperature		1	1			1	1	1	1	1	1
Temp-cooled*+				1	1						
pH		1	1	1	1	1	1	1	1	1	1
Conductivity		1	1	1	1	1	1	1	1	1	1
Chlorine										1	1

Table 2 (cont.) – Sampling Schedule and Parameters Analyzed – Snohomish, 9/92

Parameter	Location:	Ef–3	Ef–4	Ef–GC	Ef–E	Ef–ED	Ef–S	Marsh–1	Marsh–2	Sludge
	Type:	grab	grab	gr–comp	E–comp	E–comp	S–comp	grab	grab	gr–comp
	Date:	9/22/92	9/22/92	21–22/92	21–22/92	21–22/92	21–22/92	9/22/92	9/22/92	9/22/92
	Time:	----	1045	----	----	----	----	0920	0940	1530
	Lab Log #:	398165	398166	398167	398168	398173	398169	398170	398171	398172
GENERAL CHEMISTRY										
Conductivity				1	1		1	1	1	
Alkalinity				1	1		1	1	1	
Hardness				1	1		1	1	1	
TS					1	1	1			
TNVS					1	1	1			
TSS				1	1	1	1	1	1	
TNVSS					1	1	1			
% Solids										1
% Volatile Solids										1
BOD5					1		1			
BOD5 INH					1		1			
SOL BOD5					1		1			
COD					1		1	1	1	
TOC (water)					1	1	1	1	1	
TOC (soil/sed)										1
NH3–N					1	1	1	1	1	
NO2+NO3–N					1	1	1	1	1	
Total–P					1	1	1	1	1	
Oil and Grease (water)										
F–Coliform MF		1	1					1	1	
ORGANICS										
VOC (water)										
VOC (soil/sed)										1
BNAs (water)					1					
BNAs (soil/sed)										1
Pest/PCB (water)					1					
Pest/PCB (soil/sed)										1
METALS										
PP Metals (water)					1					
PP Metals (soil/sed)										1
BIOASSAYS										
Salmonid (acute 100%)				1						
Microtox (acute)				1						
Ceriodaphnia (chronic)				1						
Fathead Minnow (chronic)				1						
FIELD OBSERVATIONS										
Temperature										
Temp–cooled*+					1		1			
pH					1		1			
Conductivity					1		1			
Chlorine										

Table 3 – Ecology Laboratory General Chemistry Results – Snohomish, September 1992.

Parameter	Location:	Inf-1	Inf-2	Inf-E	Inf-S	Lag-1	Lag-2	Lag-3	Lag-4	Ef-1	Ef-2
	Type:	grab	grab	E-comp	S-comp	grab	grab	grab	grab	grab	grab
	Date:	9/21/92	9/21/92	9/22/92	9/22/92	9/21/92	9/21/92	9/21/92	9/21/92	9/21/92	9/21/92
	Time:	1045	1545	----	----	1430	1445	1500	1515	1145	1615
	Lab Log #:	398155	398156	398157	398158	398159	398160	398161	398162	398163	398164
GENERAL CHEMISTRY											
Conductivity (umhos/cm)		582	468	489	536					386	379
Alkalinity (mg/L CaCO3)		178	152	155	163					118	114
Hardness (mg/L CaCO3)		50.6	43.7	45.6	65					46.6	44.6
TS (mg/L)				533	704						
TNVS (mg/L)				178	203						
TSS (mg/L)		206	169	169	363	71	59	57	83	42	57
TNVSS (mg/L)				20	79						
% Solids											
% Volatile Solids											
BOD5 (mg/L)				213	290						
BOD5 INH (mg/L)											
SOL BOD5 (mg/L)											
COD (mg/L)		482	520	431	742					141	150
TOC (water, mg/L)		110	155	146	190	63.5	64	83.1	72.9	76.9	82.7
TOC (mg/Kg) dry-wt											
NH3-N (mg/L)				22.5	26.8						
NO2+NO3-N (mg/L)				0.03	0.02						
Total-P (mg/L)				6.54	7.02						
Oil and Grease (mg/L)		14.6	21.2							<1	4.5
F-Coliform MF (#/100ml)											
FIELD OBSERVATIONS											
Temperature (C)		20.5	20.7							17.5	18.7
Temp-cooled (C)				5.4	10.9						
pH (SU)		7.26	6.94	7.3	7.55					7.15	7.32
Conductivity (umhos/cm)		395	370	440	510					370	340
Chlorine (mg/L)											
	Free									<0.1	<0.1
	Total									0.25	0.6

Table 3 (cont.) – Ecology Laboratory General Chemistry Results – Snohomish, September 1992.

Parameter	Location:	Ef–3	Ef–4	Ef–GC	Ef–E	Ef–ED	Ef–S	Marsh–1	Marsh–2	Sludge
	Type:	grab	grab	gr–comp	E–comp	E–comp	S–comp	grab	grab	gr–comp
	Date:	9/22/92	9/22/92	9/22/92	9/22/92	9/22/92	9/22/92	9/22/92	9/22/92	9/21/92
	Time:	----	1045	----	----	----	----	0920	0940	1530
	Lab Log #:	398165	398166	398167	398168	398173	398169	398170	398171	398172
GENERAL CHEMISTRY										
Conductivity (umhos/cm)				386	386		386	157	153	
Alkalinity (mg/L CaCO3)				117	117		115	64.1	62.1	
Hardness (mg/L CaCO3)				44.2	44.2		45.6	65	63.5	
TS (mg/L)					344	332	343			
TNVS (mg/L)					141	153	133			
TSS (mg/L)				43	59	58	61	69	58	
TNVSS (mg/L)					14	8	9			
% Solids										18.1
% Volatile Solids										1.82
BOD5 (mg/L)					40		36			
BOD5 INH (mg/L)					37		37			
SOL BOD5 (mg/L)					35		22			
COD (mg/L)					160		156	81	33	
TOC (water, mg/L)					81.8	80.7	73.9	40.4	27.5	
TOC (mg/Kg) dry–wt										17,400
NH3–N (mg/L)					9.32	8.84	8.49	0.046	0.022	
NO2+NO3–N (mg/L)					0.042	0.041	0.055	.01U	.01U	
Total–P (mg/L)					4.44	4.29	4.23	0.043	0.056	
Oil and Grease (mg/L)										
F–Coliform MF (#/100ml)		15	8					69	54	
FIELD OBSERVATIONS										
Temperature (C)								13.8	14.9	
Temp–cooled (C)					5.7		9.2			
pH (SU)					7.57		7.69	6.54	6.55	
Conductivity (umhos/cm)					380		325	148	137	
Chlorine (mg/L)										
	Free	0.1	<0.1							
	Total	0.2	0.25							

through the plant, as were COD and TOC. While NH_3-N concentrations are more than halved, NO_2+NO_3-N concentrations remain nearly constant. Nitrification is not likely occurring or is masked by the biochemical processes of denitrifying bacteria. Total residual chlorine concentrations in the effluent grab samples ranged from 0.2-0.6 mg/L. The maximum free chlorine concentration measured was 0.1 mg/L. Fecal coliform bacteria were controlled by these chlorine levels in the contact basin. Table 3 documents the effluent concentrations of these parameters.

The analytical results of lagoon water samples were similar. However, it should be noted that analyses of Lag-3 and Lag-4 showed slightly elevated TSS concentrations which could represent a short circuiting across the proximal portion of the lagoon.

The general chemistry of the adjacent marsh water quality samples is such that it is inconclusive as to whether or not a hydraulic connection between the marshes and the treatment lagoon exists. Organic parameters such as COD and TOC are roughly one half the concentration of the effluent, while nutrients were low. Fecal coliform levels were slightly elevated but could be attributed to wild birds and mammals. Algal/duckweed colonies were present in both the marshes and treatment lagoon. These colonies likely contributed to the elevated TSS concentrations seen in the marsh samples. The pH of the marsh was approximately one standard unit lower than the treatment lagoon.

NPDES Permit Compliance

Compliance with the NPDES permit was good (Table 4). The Ecology compositor result for BOD_5 was higher than the monthly average limit but lower than the weekly average limit. Based on the Snohomish influent flow totalizer reading of .4 MGD (Ezzy, personal communication), the loading to the Snohomish River was 134 pounds BOD_5/day. Evaporation from the lagoon could result in an over estimate of the actual loading to the river at the time of the inspection. Regardless, the estimate is less than both the weekly and monthly averages specified in the permit.

The total suspended solids concentration seen in the Ecology composite sample was considerably lower than the weekly and monthly averages specified in the permit. The total suspended solids loading was also well within the permitted allowance at 197 pounds of TSS/day.

The geometric mean of fecal coliform bacteria counts from the two Ecology grab samples was 11/100 ml. This is substantially less than the 200/100 ml and 400/100 ml monthly and weekly averages permitted, respectively.

The pH of the discharge was within the permitted limits.

A copy of the permit is included as Appendix A.

Table 4 – NPDES Effluent Limitation/Ecology Inspection Data Comparison – Snohomish, September 1992.

	NPDES Permit Limitations		Location:	Ef-3	Ef-4	Ef-E
	Monthly Average	Weekly Average	Type:	Grab	Grab	Comp
			Date:	9/22/92	9/22/92	9/22/92
			Lab Log #:	398165	398166	398168
5 Day Biological Oxygen Demand	30 mg/L 250 lbs/day	45 mg/L 375 lbs/day				40 mg/L 134 lbs/day
Suspended Solids	75 mg/L 625 lbs/day	110 mg/L 917 lbs/day				59 mg/L 197 lbs/day
Fecal Coliform Bacteria	200/100ml	400/100ml		15	8	
pH	Shall not be outside the range of 6.0 – 9.0			7.15	7.32	

Split Sample Analyses

Table 5 presents the results of the Snohomish and Ecology split samples in tabular form. The Ecology analyses of the Snohomish influent sample indicates the Snohomish sampler intake is collecting a stronger sample which may not be representative of the sewage entering the lagoon. This is likely a result of the positioning of the strainer on the floor of the influent sewer tile while the Ecology sampler intake was suspended midflow. Another possibility is that it is an artifact of the insufficient sample volume being collected by the Snohomish compositor on September 21, 1992. It should be noted that the influent composite sample was difficult to obtain. The flow was shallow through the headworks and hard to secure a line in the headworks outlet pipe and assure the line was well positioned. The effluent results were comparable.

The Snohomish laboratory (Everett) documented a similar discrepancy in regards to the strength of the influent. However, their laboratory reported moderately higher influent BOD_5 and TSS concentrations than did the Ecology laboratory. Their laboratory also reported a lower effluent concentration of BOD_5 than did the Ecology laboratory. It should be noted that the Everett laboratory was accredited on April 10, 1992.

The Snohomish laboratory results did not detect the fecal coliform bacteria present in the split sample.

Priority Pollutants Organics - VOA, BNA and Pesticide/PCB Scans

There were 16 VOA and BNA priority pollutant organics detected in the influent to the lagoon. Eight were detected in the effluent from the lagoon, (Table 6), with six at higher concentrations than in the influent. However, all eight compounds were less than the EPA acute and chronic water quality toxicity criteria for freshwater (EPA, 1986).

Nine VOA and BNA priority pollutant organics were found in the sludge sample composited from the bottom sediments in the lagoon (Table 6). Bis(2-Ethylhexyl)Phthalate was detected at 8100 ug/Kg-dry weight. The sludge is not managed at this time, but is periodically flushed from the lagoon by the Snohomish River during flood events. The environmental significance of this phenomenon is unknown.

No pesticide or PCBs were detected in the influent, effluent or in the lagoon sediments.

A complete list of target compounds and detection limits is provided in Appendix B. Several tentatively identified compounds were also detected. These are provided in Appendix C.

Priority Pollutants Inorganic - Metals Scans

A number of priority pollutant metals were present in solution in the influent. Four were detected in the effluent (Table 6). Of these copper and silver were slightly higher than the EPA

Table 5 – Split Sample Results Comparison – Snohomish, September 1992.

		Location:	Inf–E	Inf–S	Ef–4	Ef–E	Ef–ED	Ef–S
		Type:	comp	comp	grab	comp	comp	comp
		Date:	9/22/92	9/22/92	9/22/92	9/22/92	9/22/92	9/22/92
		Lab Log #:	398157	398158	398166	398168	398173	398169
		Sampler:	Ecology	Snohomish	Ecology	Ecology	Ecology	Snohomish
PARAMETER	Analyzed by:							
Conductivity (umhos/cm)	Ecology		489	536		386		386
	Snohomish							
Alkalinity (mg/L CaCO3)	Ecology		155	163		117		115
	Snohomish							
Hardness (mg/L CaCO3)	Ecology		45.6	65		44.2		45.6
	Snohomish							
TS (mg/L)	Ecology		533	704		344	332	343
	Snohomish							
TNVS (mg/L)	Ecology		178	203		141	153	133
	Snohomish							
TSS (mg/L)	Ecology		169	363		59	58	61
	Snohomish		195	390		63		56
TNVSS (mg/L)	Ecology		20	79		14	8	9
	Snohomish							
BOD5 (mg/L)	Ecology		213	290		40		36
	Snohomish		219	344		29		27
BOD5 INH (mg/L)	Ecology					37		37
	Snohomish							
SOL BOD5 (mg/L)	Ecology					35		22
	Snohomish							
COD (mg/L)	Ecology		431	742		160		156
	Snohomish							
TOC (mg/L)	Ecology		146	190		81.8	80.7	73.9
	Snohomish							
NH3–N (mg/L)	Ecology		22.5	26.8		9.32	8.84	8.49
	Snohomish							
NO2+NO3–N (mg/L)	Ecology		0.03	0.02		0.042	0.041	0.055
	Snohomish							
Total–P (mg/L)	Ecology		6.54	7.02		4.44	4.29	4.23
	Snohomish							
Temp–cooled (C)+	Ecology		5.4	10.9		5.7	5.7	9.2
	Snohomish							
pH (S.U.)	Ecology		7.3	7.55		7.57	7.57	7.69
	Snohomish							
F–Coliform MF (#/100 mL)	Ecology				8			
	Snohomish				<2			

+ Temperature of the composite sampler at the end of the sampling period

Table 6 – VOA, BNA, Pesticide/PCB and Metals Scan Results – Snohomish, September 1992.

	Location:	Inf–1		Inf–2		Inf–E		Ef–1		Ef–2		Ef–E		Sludge		EPA Water Quality Criteria Summary					
	Type:	grab		grab		comp		grab		grab		comp		g–comp							
	Date:	9/21/92		9/21/93		9/22/92		9/21/92		9/21/92		9/22/92		9/21/92		Acute		Chronic		Acute		Chronic	
	Time:	1045		1545		----		1145		1615		----		1530		Fresh		Fresh		Marine		Marine	
	Lab Log#:	398155		398156		398157		398163		398164		398168		398172									
VOA Compounds		ug/L		ug/L		ug/L		ug/L		ug/L		ug/L		ug/Kg–dr		(ug/L)		(ug/L)		(ug/L)		(ug/L)	
Methylene Chloride			U		U				U		U			290	J	11,000	*(a)			12,000	*(a)	6,400	*(a)
Acetone		68		55				660	J	97				260	J								
Carbon Disulfide			U		U				U		U			11	N								
Chloroform		16		10				2.1		2.4					U	28,900	*	1,240	*	12,000	*(a)	6,400	*(a)
Tetrachloroethene		26		61					U		U				U	5,280	*	840	*	10,200	*	450	*
Toluene		2.2		2.4				9.5		7.8					U	17,500	*			6,300	*	5,000	*
1,1,2–Trichloro–1,2,2–Trifluoroethane			U		U			3.2		3.2					U								
BNA Compounds																							
Phenol						5.2						0.7	NJ		U	10,200	*	2,560	*	5,800	*		
1,4–Dichlorobenzene						1.4	N						U		U	1,120	*(h)	763	*(h)	1,970	*(h)		
Benzyl Alcohol						10							U		U								
4–Methylphenol						14						26			U								
Isophorone							U					0.4	J		U	117,000	*			12,900	*		
Benzoic Acid						23	N						U		U								
Naphthalene						0.4	J						U		U	2,300	*	620	*	2,350	*		
4–Chloroaniline						1.3	N						U	150	NJ								
Diethyl Phthalate						7.1							U		U	940	*(i)	3	*(i)	2.944	*(i)	3.4	*(i)
Di–n–Butyl Phthalate						3.3							U		U	940	*(i)	3	*(i)	2.944	*(i)	3.4	*(i)
Fluoranthene							U						U	170	J	3,980	*			40	*	16	*
Pyrene							U						U	130	J					300	*(n)		
Butylbenzyl Phthalate						5.7							U		U	940	*(i)	3	*(i)	2.944	*(i)	3.4	*(i)
Benzo(a)Anthracene							U						U	93	J					300	*(n)		
Chrysene							U						U	100	J					300	*(n)		
Bis(2–Ethylhexyl)Phthalate						24						1.8		8100		940	*(i)	3	*(i)	2.944	*(i)	3.4	*(i)
Di–n–Octyl Phthalate						3.2							U		U	940	*(i)	3	*(i)	2.944	*(i)	3.4	*(i)
Metals (total recoverable except sludge sample which was total)						Hardness = 100								mg/Kg–dr									
Antimony							U						U	3.7	PN	9,000	*	1,600	*				
Arsenic							U						U	12.5									
Beryllium							U						U	0.26	P	130	*	5.3	*				
Cadmium						0.49	P					0.31	P	1.3	P	3.9	+	1.1	+	43		9.3	
Chromium							U						U	44.8									
Copper						102						15		122		18	+	12	+	2.9			
Lead						6.4							U	48.8		82	+	3.2	+	140		5.6	
Mercury						0.32	PN						U	0.127	N	2.4		0.012		2.1		0.025	
Nickel							U						U	42.6		1,418	+	158	+	75		8.3	
Selenium						4.8	PN						U	0.6	N	260		35		410		54	
Silver						7.08						1.34		3.65	N	4.1	+	0.12		2.3			
Zinc						113						14	P	240		117	+	106	+	95		86	

[1]NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

U The analyte was not detected at the detection limit provided in Appendix B.
J The analyte was positively identified. The associated numerical result is an estimate.
N For organic analytes there is evidence the analyte is present in this sample.
For metals analytes the spike sample recovery is not within control limits.
NJ There is evidence that the analyte is present. The associated numerical result is an estimate.
P The analyte was detected above the instrument detection limit but below the established quantification limit.

* Insufficient data to develop criteria. Value presented is the LOEL.
** pH dependent criteria (7.8 pH used).
\+ Hardness dependent criteria (100 mg/L used).

Table 6 (cont.) – VOA, BNA, Pesticide/PCB and Metals Scan Results – Snohomish, September 1992.

a	Total Halomethanes
b	Total Dichloroethenes
c	Total Trichloroethanes
d	Total Dichloropropanes
e	Total Dichloropropenes
f	Total Tetrachloroethanes
g	Total Chlorinated Benzenes (excluding Dichlorobenzenes)
h	Total Dichlorobenzenes
i	Total Phthalate Esters
j	Total Chloroalkyl Ethers
k	Total Nitrosamines
l	Total Nitrophenols
m	Total Chlorinated Naphthalenes
n	Total Polynuclear Aromatic Hydrocarbons
o	Total Dinitrotoluenes
p	Total Haloethers
q	Total BHCs
r	Heptachlor
s	Endosulfan
t	Endrin
u	DDT plus metabolites
v	Total Chlordane
w	Total Aroclors (PCBs)

Priority Pollutants Not On List:
Asbestos
Cyanide
Dimethylnitrosamine
Acrylonitrile
Acrolein
TCDD (Dioxin)

freshwater chronic toxicity criteria. Within the dilution zone these concentrations would fall below the toxicity criteria.

All priority pollutant metals analyzed for were detected in low concentrations in the lagoon sludge. Of these, copper (at 122 mg/Kg dry-weight) slightly exceeded the Severe-Effects Level of the Ontario Ministry of the Environment, Provincial Sediment Guideline for copper at 110 mg/Kg dry-weight (Bennett and Cubbage, 1991). The Severe-Effects Level is characterized by the pronounced disturbance of sediment-dwelling organisms. Contaminant concentrations at these levels would be detrimental to the majority of benthic species.

A complete list of target compounds and detection limits is provided in Appendix B.

Bioassays

The bioassay results of dechlorinated effluent demonstrated little in the way of effluent toxicity. The *Ceriodaphnia dubia* and *Pimephales promelas*, Chronic Renewal Toxicity tests showed the LC_{50}s at greater than 100% effluent and NOEC at 100% effluent (Table 7). The *Oncorhynchus mykiss* Static Acute Toxicity test showed the LC_{50} at greater than 100% effluent (Table 7). The Manchester Laboratory estimated the EC_{50} of Microtox at 83.9% effluent using Microtox software.

Plant Capacity

The inspection was conducted during the extended dry season typical of early fall in the Northwest. Little to no inflow/infiltration was occurring at the time. The water temperature of the lagoon was expected to be near its seasonal maximum with flows at the minimum. These conditions promote best case biological treatment of the influent organics load.

The influent organic load during the inspection was 710 lbs BOD_5/day. This is 88.7% of the 800 lbs/day capacity specified in the permit. The influent inspection data suggests developing a plan and schedule for maintaining adequate capacity may be necessary. The BOD_5 loading to the Snohomish River calculated from inspection data is 53.6% of the effluent monthly average limitation specified in the NPDES permit. The TSS loading to the river is only 31.5% of the effluent monthly average limitation. Based on a .4 MGD flow recorded by the Snohomish totalizer during the inspection period, the plant flow is only 40% of the design capacity specified in the permit.

RECOMMENDATIONS AND CONCLUSIONS

Flow Measurement

The influent Parshall flume was measured and found to be configured properly. The instantaneous flow measurement corresponded well with the flow measurements recorded by Snohomish and were considered reliable.

Table 7 – Effluent Bioassay Results – Snohomish, September 1992.

NOTE: All tests were run on the effluent (Ef-GC sample) - lab log # 398167

Ceriodaphnia dubia - Chronic Renewal Toxicity Test

Sample	# Tested	Percent Survival	Mean # Young per Original Female
Control	10	100	16.4
6.25 % Effluent	10	90	15.1
12.5 % Effluent	10	100	17.7
25 % Effluent	10	100	18.9
50 % Effluent	10	90	14.7
100 % Effluent	10	100	17

* 10 replicates of 1 organism

LC50 = >100 % Effluent NOEC = 100 % Effluent

Fathead Minnow (Pimephales promelas) - Chronic Renewal Toxicity Test

Sample	# Tested *	Percent Survival	Mean dry weight of organism
Control	30	100	0.34
6.25 % Effluent	30	90	0.37
12.5 % Effluent	30	100	0.31
25 % Effluent	30	100	0.37
50 % Effluent	30	90	0.34
100 % Effluent	30	100	0.30

* 3 replicates of 10 organisms

LC50 = >100 % Effluent NOEC = 100 % Effluent

Table 7 (cont.) – Effluent Bioassay Results – Snohomish, September 1992.

Rainbow Trout (Oncorhynchus mykiss) - Static Acute Toxicity Test

Sample	# Tested *	Percent Survival
Control	30	100
100% Effluent	30	100

* 3 replicates of 10 organisms

LC50 = >100 % Effluent

\# upon introduction to the effluent, fish behaved erratically. Normal behavior resumed within 12 hours (Noble, 1991).

Microtox - Toxicity Test *

EC50 = >45% (Manchester Laboratory estimates the EC50 to be 83.9% using Microtox software)

* 2 replicates

NOEC – no observable effects concentration
LOEC – lowest observable effects concentration
LC50 – lethal concentration for 50% of the organisms
EC50 – effect concentration for 50% of the organisms

The effluent flow measurements could not be verified due to access problems. A new flow meter is scheduled for installation in the future and should be evaluated by the Regional Water Quality engineer.

General Chemistry/NPDES Compliance

The inspection data found the Snohomish lagoon substantially reduces influent BOD_5, TSS and NH_3-N concentrations. Effluent concentrations were generally within the NPDES specified permit limits, although the effluent BOD_5 of 40 mg/L, exceeded the monthly limit of 30 mg/L.

Split Sample Results

Snohomish influent sampling did not appear to be representative, over reporting the strength of the influent relative to the Ecology results. The problem may have been temporary due to adjustments the operator made for inspection sampling. An improved influent sampling station should be investigated.

The Snohomish laboratory (Everett) under reported the strength of the BOD_5 concentration of the effluent by approximately 30% (as compared to Ecology laboratory results).

Treatment Plant Loading

During the summer a dry weather pattern was experienced during the inspection period, BOD_5 and TSS loadings to the Snohomish River were well within the loading limitations specified in the permit. The flow estimated at the time of the inspection was approximately 40% of the design criteria. The influent organic load was 700 lbs BOD_5/day. This is 88.7% of the design capacity specified in the permit, suggesting a plan and schedule for maintaining capacity should be developed.

Whole Effluent Toxicity

A number of priority pollutants were detected in the influent and the effluent at low concentrations. However, the chronic and acute bioassays indicated the whole effluent exhibited little toxicity.

General Comment

The height of the lagoon dike should be raised so that flood events do not scour the residual solids from the lagoon and release them into the environment. A solids management plan should be developed, providing for solids removal from the lagoon on a periodic basis.

REFERENCES

Bennett, J. and J. Cubbage, 1991. Summary of Criteria and Guidelines for Contaminated Freshwater Sediments. Washington State Department of Ecology.

Ecology, 1991. Laboratory Users Manual. Washington State Department of Ecology, Environmental Investigations and Laboratory Services Program.

------, 1985. Criteria for Sewage Works Design. Washington State Department of Ecology 78-5, revised October 1985.

Ezzy, J. 1993. Personal communication. Snohomish County Public Works.

USEPA, 1986. Quality Criteria for Water. U.S. Environmental Protection Agency, EPA 440/5-86-001, 1986.

APPENDICES

APPENDIX A

Permit Number WA-002954-3

Issuance Date: September 14, 1982
Expiration Date: September 14, 1987

NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM
WASTE DISCHARGE PERMIT

State of Washington
DEPARTMENT OF ECOLOGY
Olympia, Washington 98504

In compliance with the provisions of
Chapter 90.48 Revised Code of Washington as amended
and
The Clean Water Act as amended
Public Law 95-217

CITY OF SNOHOMISH
City Hall
1009 First Street
Snohomish, Washington 98290

Plant Location:

Slough Road and Highway 9

Receiving Water:

Snohomish River

Waterway Segment Number:

03-07-10

Discharge Location:

Latitude: 47° 54' 47" N

Longitude: 122° 06' 37" W

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is authorized to discharge in accordance with the special and general conditions which follow.

Bruce A. Cameron
Assistant Director
Department of Ecology (2)

SPECIAL CONDITIONS

S1. EFFLUENT LIMITATIONS

Beginning on the issuance date of this permit and lasting through the expiration date of this permit, the permittee is authorized to discharge treated municipal wastewater to the Snohomish River at the permitted discharge location subject to the following limitations:

	EFFLUENT LIMITATIONS	
Parameter	Monthly Average	Weekly Average
Biochemical Oxygen Demand* (5 day)	30 mg/l, 250 lbs/day	45 mg/l, 375 lbs/day
Suspended Solids	75 mg/l, 625 lbs/day	110 mg/l, 917 lbs/day
Fecal Coliform Bacteria	200/100 ml	400/100 ml
pH**	Shall not be outside the range 6.0 - 9.0	

*The monthly average effluent concentrations limitations for BOD_5 shall not exceed 30 mg/l or 15 percent of the respective influents concentrations, whichever is more stringent. The minimum reduction requirement does not apply during wet weather months, normally October through March inclusively, when plant flows are increased by stormwaters entering through combined sanitary/storm sewers.

**Effluent values for pH shall not exceed the limits 6.0 - 9.0 where such values are attributable to inorganic chemical addition to the treatment process or to industrial contributions.

The monthly and weekly averages for BOD_5 and Suspended Solids are based on the arithmetic mean of the samples taken. The averages for Fecal Coliform are based on the geometric mean of the samples taken.

Total available residual chlorine shall be maintained which is sufficient to attain the Fecal Coliform limits specified above. Chlorine concentrations in excess of that necessary to reliably achieve the limits shall be avoided.

S2. TESTING SCHEDULE

The permittee shall monitor the discharge and in-plant operation according to the following schedule:

Tests	Sample Point	Sampling Frequency	Sample Type
Temperature	individual cells	weekly	
pH	final effluent	daily	
Flow	influent & effluent	daily	continuous recor
Total Available (Residual) Chlorine*	final effluent	5/7 days	
DO	raw sewage	weekly	
	facultative cell	weekly	
	unchlorinated effluent	weekly	
BOD_5	raw sewage	weekly	24 hr. composite
	unchlorinated effluent	weekly	24 hr. composite
Total Suspended Solids	raw sewage	weekly	24 hr. composite
	unchlorinated effluent	weekly	24 hr. composite
Settleable Solids	raw sewage	daily	
	final effluent	daily	
Fecal Coliform*	final effluent	weekly	

Note: Unless otherwise indicated, sample type is grab.

*Total Available (Residual) Chlorine shall be measured and reported at the same time Fecal Coliform samples are taken.

S3. MONITORING AND REPORTING

a. Reporting

A monthly report recording each required analysis shall be submitted no later than the 15th day of the following month. The monthly reporting form will be supplied to the permittee or approved by the department and sent to the Northwest Regional Office of the Washington State Department of Ecology, 4350 - 150th Avenue N.E., Redmond, Washington 98052.

In addition, a summary report form (EPA Form 3320-1) covering a one month period, shall be submitted no later than the 15th day of the following month. This report is limited to the limitations listed in Condition S1.

Monitoring shall be started on the effective date of this permit and the first monthly report is due 45 days thereafter.

If the permittee monitors any pollutant any more frequently than required by the permit, he shall record and report such results.

b. Records Retention

The permittee shall retain for a minimum of three years all records of monitoring activities and results, including all reports of recordings from continuous monitoring instrumentation. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the permittee or when requested by the director.

c. Recording of Results

For each measurement or sample taken, the permittee shall record the following information: (1) the date, exact place, and time of sampling; (2) the dates the analyses were performed; (3) who performed the analyses; (4) the analytical techniques or methods used; and (5) the results of all analyses.

d. Representative Sampling

Samples and measurements taken to meet the requirements of this condition shall be representative of the volume and nature of the monitored discharge.

S3. MONITORING AND REPORTING (Continued)

e. Test Procedures

All sampling and analytical methods used to meet the monitoring requirements specified in this permit shall, unless approved otherwise in writing by the Department, conform to the Guidelines Establishing Test Procedures for the Analysis of Pollutants, contained in 40 CFR Part 136, as published in the Federal Register on December 1, 1976, or the latest revision thereof, which references the following publications:

1. American Public Health Association, Standard Methods for the Examination of Water and Wastewaters.

2. American Society for Testing and Materials, A.S.T.M. Standards, Part 31, Water, Atmospheric Analysis.

3. Environmental Protection Agency, Methods for Chemical Analysis of Water and Wastes.

S4. PREVENTION OF FACILITY OVERLOADING

a. Design Criteria

The design criteria for the permitted treatment facility are as follows:

Design Flow, Monthly Average	1.00 MGD
Design Organic Loading:	
Biological Oxygen Demand	800 lbs BOD_5/day (0.2 x 4700 population)
Volumetric Loading based on	20 lbs BOD_5/acre

b. Plans for Maintaining Adequate Capacity

When the actual flow or waste load reaches 85 percent of the design capacity as specified in Paragraph a., or when the projected increases would reach design capacity within five years, whichever occurs first, the permittee shall submit to the department, a plan and a schedule for continuing to maintain adequate capacity. This plan shall address any and all of the actions necessary to meet this objective. This may include the following items:

1. Analysis of the present design and/or process modifications that would establish the ability of the existing facility to reliably treat flows and/or waste loads (i.e., achieve the effluent limits and other requirements of this permit), in excess of the existing design criteria.

S4. PREVENTION OF FACILITY OVERLOADING (Continued)

2. Elimination of excessive infiltration and inflow of uncontaminated ground and surface water into the sewer system to reduce extraneous flow.

3. Limitation on future sewer extension or connections or additional flow or waste load.

4. Modification or expansion of facilities necessary to accommodate increased flow or waste load.

5. Any other actions necessary to achieve this objective. The plan shall specify and contracts, ordinances, methods for financing or other arrangements necessary to achieve this objective.

S5. NOTIFICATION OF SIGNIFICANT NEW OR ALTERED SOURCES

The permittee shall submit written notice to the department whenever any new or altered commercial or industrial source proposes to discharge waste into it's municipal sewer system which may interfere with the operation of the treatment works including interference with the use or disposal of municipal sludge and/or which may pass through the treatment works causing violations of the State Water Quality Standards (Chapter 173-201 Washington Administrative Code). Connection to the sewer system shall not be allowed until the commercial or industrial applicant obtains a State Waste Discharge Permit as provided in the Revised Code of Washington Chapter 90.48.160.

The permittee shall assist the department in monitoring commercial and industrial discharges into the municipal sewer system.

S6. RESIDUAL SOLIDS HANDLING

a. The permittee shall handle, utilize and dispose of all residual solids in such a manner as to prevent its entry into state ground or surface waters.

b. The permittee shall not permit leachate from its residual solids to enter state surface waters without providing all known, available and reasonable methods of treatment, nor permit such leachate to cause any adverse effect on state ground waters. The permittee shall apply for a permit or permit modification as may be required for such discharges.

c. The permittee shall submit once each year a report detailing the sewage treatment plant residual solids utilization and disposal activities for the preceding twelve months. The report shall be submitted to the Department of Ecology within thirty days after the end of each calendar year.

The report shall include the following information:

1. A map showing each sludge utilization and disposal site (a photocopy of a 7½ or 15 minute U.S.G.S. quadrangle map will be acceptable). The map shall indicate any surface waters or wells in the vicinity.

2. An approximate summary of quantities of sludge disposed or utilized at each site.

3. A statement, for each site, of the existing land use. If agricultural, state crop grown or types of animals grazed.

4. A statement indicating whether sludge is made available to the general public.

5. A statement of measures used to control access to the site.

6. A statement indicating how scum, grit and other residual solids are disposed of, if handled separately from the sludge.

A report form is available from the Washington State Department of Ecology for summarizing the information of 2. through 6., above.

d. The requirements of part c. above will be waived for any sites for which a solid waste disposal site permit is obtained through the jurisdictional health department.

S7. OPERATION AND MAINTENANCE OF FACILITIES

In accordance with the Washington Administrative Code, Chapter 173-230 (Certification of Operators of Wastewater Treatment Plants), the permittee shall provide an adequate operating staff which is qualified to carry out the operation, maintenance and testing activities required to insure compliance with the conditions of this permit. An operator certified for a Class I plant by the State of Washington shall be in responsible charge of the day-to-day operation of the wastewater treatment plant.

S8. CONSTRUCTION OR MAINTENANCE RELATED REDUCTION IN LEVEL OF TREATMENT

If the permittee contemplates a reduction in the required level of treatment that would exceed permit effluent limitations on a short-term basis for any reason, and such reduction cannot be avoided, the permittee shall give written notification to the department, if possible, 30 days prior to such activities, detailing the reasons for, length of time of, and the potential effects of the reduced level of treatment. If such a reduction involves a bypass, the requirements of Condition G5. and the "Construction or Maintenance Related Overflow or Bypass" conditions must be met.

S9. CONSTRUCTION OR MAINTENANCE RELATED OVERFLOW OR BYPASS

Bypasses of untreated or partially treated sewage during construction or maintenance shall be avoided if at all feasible.

If a construction or maintenance related overflow or bypass is contemplated, the permittee shall submit to the department not less than 90 days prior to the contemplated overflow or bypass, a report which describes in detail any construction work which will result in the overflow or bypass of wastewater. The report shall contain: (1) an analysis of all known alternatives which would eliminate, reduce, or mitigate the need for bypassing; (2) a cost-effective analysis of alternatives including comparative resource damage assessment; (3) the minimum and maximum duration of bypass under each alternative; (4) a recommendation as to the preferred alternative for conducting the bypass; (5) the projected date of bypass initiation; (6) a statement of compliance with the State Environmental Policy Act; and (7) a request for a water quality modification, as provided for in Chapter 173-201-100(2) of the Washington Administrative Code.

For probable construction bypasses, the need to bypass is to be identified as early in the planning process as possible. The analysis required above shall be considered during preparation of the engineering report or facilities plan and plans and specifications, and shall be included to the extent practical. In cases where the probable need to bypass is determined early, continued analysis is necessary up to and including the construction period in an effort to minimize or eliminate the bypass.

Final authorization to bypass may be granted after review of the above information, in accordance with Condition G5. Authorization to bypass will only be by administrative order.

S10. PROVISION FOR ELECTRIC POWER FAILURE

The permittee is responsible for maintaining adequate safeguards to prevent the discharge of untreated wastes or wastes not treated in accordance with the requirements of this permit during electric power failure at the treatment plant and/or sewage lift stations either by means of alternate power sources, standby generator, or retention of inadequately treated wastes.

S11. COMBINED SEWER OVERFLOWS

The following is a list of combined sewer overflows which are occasional point sources of pollutants as a result of precipitation events. The permittee shall employ all available and reasonable measures to prevent or moderate such discharges. Such discharges shall not violate water quality standards.

Discharge No.	Location	Receiving Water
Pump Station No. 1	1st Street & Avenue D	Snohomish River
Pump Station No. 4	1st Street 7 State	Snohomish River

GENERAL CONDITIONS

G1. All discharges and activities authorized by this permit shall be consistent with the terms and conditions of this permit. The discharge of any pollutant more frequently than or at a level in excess of that authorized by this permit shall constitute a violation of the terms and conditions of this permit.

G2. The permittee shall at all times properly operate and maintain all facilities and systems of collection, treatment and control (and related appurtenances) which are installed or used by the permittee to achieve compliance with conditions of this permit.

G3. The permittee, in order to maintain compliance with its permit, shall control production and/or all discharges upon reduction, loss, failure, or bypass of the treatment facility until the facility is restored or an alternative method of treatment is provided. This requirement applies in the situation where, among other things, the primary source of power of the treatment facility is reduced, lost, or fails.

G4. If, for any reason, the permittee does not comply with or will be unable to comply with any of the discharge limitations or other conditions specified in the permit, the permittee shall, at a minimum, provide the department with the following information:

a. A description of the nature and cause of noncompliance, including the quantity and quality of any unauthorized waste discharges;

b. The period of noncompliance, including exact dates and times and/or the anticipated time when the permittee will return to compliance; and

c. Steps taken or to be taken to reduce, eliminate, and prevent recurrence of the noncompliance.

In addition, the permittee shall take immediate action to stop, contain, and clean up any unauthorized discharges and take all reasonable steps to minimize any adverse impacts to waters of the state and correct the problem. The permittee shall notify the department immediately by telephone so that an investigation can be made to evaluate any resulting impacts and the corrective actions taken to determine if additional action should be taken.

In the case of any discharge subject to any applicable toxic pollutant effluent standard under Section 307 (a) of the Clean Water Act, or which could constitute a threat to human health, welfare, or the environment, 40 CFR Part 122 requires that the information specified in items G4.a., G4.b., and G4.c., above, shall be provided not later than 24 hours from the time the permittee becomes aware of the circumstances. If this information is provided orally, a written submission covering these points shall be provided within five days of the time the permittee becomes aware of the circumstances, unless the department waives or extends this requirement on a case-by-case basis.

Compliance with these requirements does not relieve the permittee from responsibility to maintain continuous compliance with the conditions of this permit or the resulting liability for failure to comply.

G5. The intentional bypass of wastes from all or any portion of a treatment works to the extent that permit effluent limitations cannot be met is prohibited unless the following four conditions are met:

a. Bypass is: (1) unavoidable to prevent loss of life, personal injury, or severe property damage; or (2) necessary to perform construction or maintenance-related activities essential to meet the requirements of the Clean Water Act and authorized by administrative order;

b. There are no feasible alternatives to bypass, such as the use of auxiliary treatment facilities, retention of untreated wastes, maintenance during normal periods of equipment down time, or temporary reduction or termination of production;

c. The permittee submits notice of an unanticipated bypass to the department in accordance with Condition G4. Where the permittee knows or should have known in advance of the need for a bypass, this prior notification shall be submitted for approval to the department, if possible, at least 30 days before the date of bypass (or longer if specified in the special conditions);

d. The bypass is allowed under conditions determined to be necessary by the department to minimize any adverse effects. The public shall be notified and given an opportunity to comment on bypass incidents of significant duration, to the extent feasible.

"Severe property damage" means substantial physical damage to property, damage to the treatment facilities which would cause them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

After consideration of the factors above and the adverse effects of the proposed bypass, the department will approve or deny the request. Approval of a request to bypass will be by administrative order under RCW 90.48.120.

G6. The permittee shall allow an authorized representative of the department, upon the presentation of credentials and such other documents as may be required by law:

a. To enter upon the permittee's premises where a discharge source is located or where any records must be kept under the terms and conditions of the permit;

b. To have access to and copy at reasonable times any records that must be kept under the terms and conditions of the permit;

c. To inspect at reasonable times any monitoring equipment or method required in the permit;

d. To inspect at reasonable times any collection, treatment, pollution management, or discharge facilities required under the permit;

e. To sample at reasonable times any discharge of pollutants.

G7. The permittee shall submit a new application or supplement to the previous application where facility expansions, production increases, or process

modifications will (1) result in new or substantially increased discharges of pollutants or a change in the nature of the discharge of pollutants, or (2) violate the terms and conditions of the existing permit.

G8. After notice and opportunity for public hearing, this permit may be modified, terminated, or revoked during its term for cause as follows:

a. Violation of any term or condition of the permit;

b. Failure of the permittee to disclose fully all relevant facts or misrepresentation of any relevant facts by the permittee in the application or during the permit issuance process;

c. A change in any condition that requires either a temporary or a permanent reduction or elimination of any discharge controlled by the permit;

d. Information indicating that the permitted discharge poses a threat to human health or welfare;

e. A change in ownership or control of the source; or

f. Other cause listed in 40 CFR Part 122.15 and 122.16.

Permit modification, revocation and reissuance, or termination may be initiated by the department or requested by any interested person.

G9. A permittee who knows or has reason to believe that any activity has occurred or will occur which would constitute cause for modification or revocation and reissuance under Condition G8. or 40 CFR Part 122.15 must report its plans, or such information, to the department so that a decision can be made on whether action to modify or revoke and reissue a permit will be required. The department may then require submission of a new application. Submission of such application does not relieve the discharger of the duty to comply with the existing permit until it is modified or reissued.

G10. If any applicable toxic effluent standard or prohibition (including any schedule of compliance specified in such effluent standard or prohibition) is established under Section 307(a) of the Clean Water Act for a toxic pollutant and that standard or prohibition is more stringent than any limitation upon such pollutant in the permit, the department shall institute proceedings to modify or revoke and reissue the permit to conform to the toxic effluent standard or prohibition.

G11. Prior to constructing or modifying any wastewater control facilities, detailed plans shall be submitted to the department for approval in accordance with WAC 173-240. Facilities shall be constructed and operated in accordance with the approved plans.

G12. All other requirements of 40 CFR Part 122.7, 122.60, and 122.61 are incorporated into this permit by reference.

G13. Nothing in this permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations.

Appendix B – VOA, BNA, Pesticide/PCB and Metals Scan Results – Snohomish, September 1992.

Location:	INF1	INF2	INFE	EF1	EF2	EFE	SLUDGE	EPA Water Quality Criteria Summary			
Type:	grab	grab	comp	grab	grab	comp	g-comp	Acute	Chronic	Acute	Chronic
Date:	9/21/92	9/21/93	9/22/92	9/21/92	9/21/92	9/22/92	9/21/92				
Lab Log#:	398155	398156	398157	398163	398164	398168	398172				
VOA Compounds	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/Kg-dr	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Chloromethane	2 U	2 U		2 U	2 U		14 U	11,000 *(a)		12,000 *(a	6,400 *(a)
Bromomethane	2 U	2 U		2 U	2 U		14 U	11,000 *(a)		12,000 *(a	6,400 *(a)
Vinyl Chloride	2 U	2 U		2 U	2 U		14 U				
Chloroethane	2 U	2 U		2 U	2 U		14 U				
Methylene Chloride	8.9 U	4.7 U		45 U	21 U		290 J	11,000 *(a)		12,000 *(a	6,400 *(a)
Acetone	68	55		660 J	97		260 J				
Carbon Disulfide	1 U	1 U		1 U	1 U		11 N				
1,1-Dichloroethene	1 U	1 U		1 U	1 U		6.9 U	11,600 *(b)		224,000 *(b)	
1,1-Dichloroethane	1 U	1 U		1 U	1 U		6.9 U				
1,2-Dichloroethene (total)	1 U	1 U		1 U	1 U		6.9 U	11,600 *(b)		224,000 *(b)	
Chloroform	16	10		2.1	2.4		6.9 U	28,900 *	1,240 *	12,000 *(a	6,400 *(a)
1,2-Dichloroethane	1 U	1 U		1 U	1 U		6.9 U	118,000 *	20,000 *	113,000 *	
2-Butanone (MEK)	5 U	5 U		5 U	5 U		35 U				
1,1,1-Trichloroethane	1 U	1 U		1 U	1 U		6.9 U	18,000 *(c)		31,200 *	
Carbon Tetrachloride	1 U	1 U		1 U	1 U		6.9 U	35,200 *		50,000 *	6,400 *(a)
Vinyl Acetate	1 U	1 U		1 U	1 U		6.9 U				
Bromodichloromethane	1 U	1 U		1 U	1 U		6.9 U	11,000 *(a)		12,000 *(a	6,400 *(a)
1,2-Dichloropropane	1 U	1 U		1 U	1 U		6.9 U	23,000 *(d)	5,700 *(d)	10,300 *(d	3,040 *(d)
cis-1,3-Dichloropropene	1 U	1 U		1 U	1 U		6.9 U	6,060 *(e)	244 *(e)	790 *(e)	
Trichloroethene	1 U	1 U		1 U	1 U		6.9 U	45,000 *	21,900 *	2,000 *	
Dibromochloromethane	1 U	1 U		1 U	1 U		6.9 U	11,000 *(a)		12,000 *(a	6,400 *(a)
1,1,2-Trichloroethane	1 U	1 U		1 U	1 U		6.9 U	18,000 *(c)	9,400 *		
Benzene	1 U	1 U		1 U	1 U		6.9 U	5,300 *		5,100 *	700 *
trans-1,3-Dichloropropene	1 U	1 U		1 U	1 U		6.9 U	6,060 *(e)	244 *(e)	790 *(e)	
Bromoform	1 U	1 U		1 U	1 U		6.9 U	11,000 *(a)		12,000 *(a	6,400 *(a)
4-Methyl-2-Pentanone (MIBK)	5 U	5 U		5 U	5 U		35 U				
2-Hexanone	5 U	5 U		5 U	5 U		35 U				
Tetrachloroethene	26	61		1 U	1 U		6.9 U	5,280 *	840 *	10,200 *	450 *
1,1,2,2-Tetrachloroethane	1 U	1 U		1 U	1 U		6.9 U	9,320 *(f)	2,400 *	9,020 *	
Toluene	2.2	2.4		9.5	7.8		6.9 U	17,500 *		6,300 *	5,000 *
Chlorobenzene	1 U	1 U		1 U	1 U		6.9 U	250 *(g)	50 *(g)	160 *(g	129 *(g)
Ethylbenzene	1 U	1 U		1 U	1 U		6.9 U	32,000 *		430 *	
Styrene	1 U	1 U		1 U	1 U		6.9 U				
Total Xylenes	2 U	2 U		2 U	2 U		14 U				
Trichlorofluoromethane	2 U	2 U		2 U	2 U		14 U	11,000 *(a)		12,000 *(a	6,400 *(a)
1,1,2-Trichlorotrifluoroethane	2 U	2 U		3.2	3.2		14 U				
BNA Compounds											
Phenol			5.2			0.7 NJ	360 U	10,200 *	2,560 *	5,800 *	
Bis(2-Chloroethyl)Ether			1 U			1 U	180 U	238,000 *(j)			
2-Chlorophenol			1 U			1 U	180 U	4,380 *	2,000 *		
1,3-Dichlorobenzene			1 U			1 U	180 U	1,120 *(h)	763 *(h)	1,970 *(h)	
1,4-Dichlorobenzene			1.4 N			1 U	180 U	1,120 *(h)	763 *(h)	1,970 *(h)	
Benzyl Alcohol			10			5 U	890 U				
1,2-Dichlorobenzene			1 U			1 U	180 U	1,120 *(h)	763 *(h)	1,970 *(h)	
2-Methylphenol			1 U			1 U	180 U				
Bis(2-Chloroisopropyl)Ether			1 U			1 U	180 U	238,000 *(j)			
4-Methylphenol			14			26	180 U				
N-Nitroso-di-n-Propylamine			1 U			1 U	180 U	5,850 *(k)		******* *(k)	
Hexachloroethane			2 U			2 U	360 U	980 *	540 *	940 *	
Nitrobenzene			1 U			1 U	180 U	27,000 *		6,680 *	
Isophorone			1 U			0.4 J	180 U	117,000 *		12,900 *	
2-Nitrophenol			5 U			5 U	890 U	230 *(l)	150 *(l)	4,850 *(l)	
2,4-Dimethylphenol			2 U			2 U	360 U	2,120 *			
Benzoic Acid			23 N			10 U	1800 U				

Appendix B (cont.) – VOA, BNA, Pesticide/PCB and Metals Scan Results – Snohomish, September 1992.

Location:	INF1	INF2	INFE	EF1	EF2	EFE	SLUDGE	EPA Water Quality Criteria Summary			
Type:	grab	grab	comp	grab	grab	comp	g-comp				
Date:	9/21/92	9/21/93	9/22/92	9/21/92	9/21/92	9/22/92	9/21/92	Acute	Chronic	Acute	Chronic
Lab Log#:	398155	398156	398157	398163	398164	398168	398172				
BNA Compounds	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/Kg-dr	(ug/L)	(ug/L)	(ug/L)	(ug/L)
Bis(2-Chloroethoxy)Methane			1 U			1 U	180 U	238,000 *(j)			
2,4-Dichlorophenol			3 U			3 U	530 U	2,020 *	365 *		
1,2,4-Trichlorobenzene			1 U			1 U	180 U	250 *(g)	50 *(g)	160 *(g	129 *(g
Naphthalene			0.4 J			1 U	180 U	2,300 *	620 *	2,350 *	
4-Chloroaniline			1.3 N			3 U	150 NJ				
Hexachlorobutadiene			2 U			2 U	360 U	90 *	9.3 *	32 *	
4-Chloro-3-Methylphenol			2 U			2 U	360 U	30 *			
2-Methylnaphthalene			1 U			1 U	180 U				
Hexachlorocyclopentadiene			5 U			5 U	890 U	7 *	5.2 *	7 *	
2,4,6-Trichlorophenol			5 U			5 U	890 U		970 *		
2,4,5-Trichlorophenol			5 U			5 U	890 U				
2-Chloronaphthalene			1 U			1 U	180 U	1,600 *(m)		7.5 *(m)	
2-Nitroaniline			5 U			5 U	890 U				
Dimethyl Phthalate			1 U			1 U	180 U	940 *(i)	3 *(i)	2.944 *(i)	3.4 *(i)
Acenaphthylene			1 U			1 U	180 U			300 *(n)	
2,6-Dinitrotoluene			5 U			5 U	890 U	330 *(o)	230 *(o)	590 *(o	370 *(o
3-Nitroaniline			5 U			5 U	890 U				
Acenaphthene			1 U			1 U	180 U	1,700 *	520 *	970 *	710 *
2,4-Dinitrophenol			10 U			10 U	1800 U	230 *(l)	150 *(l)	4,850 *(l)	
4-Nitrophenol			5 U			5 U	890 U	230 *(l)	150 *(l)	4,850 *(l)	
Dibenzofuran			1 U			1 U	180 U				
2,4-Dinitrotoluene			5 U			5 U	890 U	330 *(o)	230 *(o)	590 *(o	370 *(o
Diethyl Phthalate			7.1			1 U	180 U	940 *(i)	3 *(i)	2.944 *(i)	3.4 *(i)
4-Chlorophenyl Phenylether			1 U			1 U	180 U	360 *(p)	122 *(p)		
Fluorene			1 U			1 U	180 U			300 *(n)	
4-Nitroaniline			5 U			5 U	890 U				
4,6-Dinitro-2-Methylphenol			10 U			10 U	1800 U	230 *(l)	150 *(l)	4,850 *(l)	
N-Nitrosodiphenylamine			1 U			1 U	180 U	5,850 *(k)		******* *(k)	
4-Bromophenyl Phenylether			1 U			1 U	180 U	360 *(p)	122 *(p)		
Hexachlorobenzene			1 U			1 U	180 U	250 *(g)	50 *(g)	160 *(g	129 *(g
Pentachlorophenol			5 U			5 U	890 U	20 **	13 **	13	7.9 *
Phenanthrene			1 U			1 U	180 U			300 *(n)	
Carbazole			1 U			1 U	180				
Anthracene			1 U			1 U	180 U			300 *(n)	
Di-n-Butyl Phthalate			3.3			1 U	180 U	940 *(i)	3 *(i)	2.944 *(i)	3.4 *(i)
Fluoranthene			1 U			1 U	170 J	3,980 *		40 *	16 *
Pyrene			1 U			1 U	130 J			300 *(n)	
Butylbenzyl Phthalate			5.7			1 U	180 U	940 *(i)	3 *(i)	2.944 *(i)	3.4 *(i)
3,3'-Dichlorobenzidine			5 U			5 U	890 U				
Benzo(a)Anthracene			1 U			1 U	93 J			300 *(n)	
Chrysene			1 U			1 U	100 J			300 *(n)	
Bis(2-Ethylhexyl)Phthalate			24			1.8	8100	940 *(i)	3 *(i)	2.944 *(i)	3.4 *(i)
Di-n-Octyl Phthalate			3.2			1 U	180 U	940 *(i)	3 *(i)	2.944 *(i)	3.4 *(i)
Benzo(b)Fluoranthene			1 U			1 U	180 U			300 *(n)	
Benzo(k)Fluoranthene			1 U			1 U	180 U			300 *(n)	
Benzo(a)Pyrene			1 U			1 U	180 U			300 *(n)	
Indeno(1,2,3-cd)Pyrene			1 U			1 U	180 U			300 *(n)	
Dibenzo(a,h)Anthracene			1 U			1 U	180 U			300 *(n)	
Benzo(g,h,i)Perylene			1 U			1 U	180 U			300 *(n)	

Appendix B (cont.) – VOA, BNA, Pesticide/PCB and Metals Scan Results – Snohomish, September 1992.

Location:	INF1	INF2	INFE	EF1	EF2	EFE	SLUDGE	EPA Water Quality Criteria Summary			
Type:	grab	grab	comp	grab	grab	comp	g-comp	Acute	Chronic	Acute	Chronic
Date:	9/21/92	9/21/93	9/22/92	9/21/92	9/21/92	9/22/92	9/21/92				
Lab Log#:	398155	398156	398157	398163	398164	398168	398172				
Pesticide/PCB Compounds	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/Kg-dr	(ug/L)	(ug/L)	(ug/L)	(ug/L)
alpha-BHC			0.05 U			0.05 U	9 U	100 *(q)		0.34 *(q)	
beta-BHC			0.05 U			0.05 U	9 U	100 *(q)		0.34 *(q)	
delta-BHC			0.05 U			0.05 U	9 U	100 *(q)		0.34 *(q)	
gamma-BHC (Lindane)			0.05 U			0.05 U	9 U	2.0	0.08	0.16	
Heptachlor			0.05 U			0.05 U	9 U	0.52 (r)	0.0038 (r)	0.053 (r)	0.0036 (r)
Aldrin			0.05 U			0.05 U	9 U	3.0		1.3	
Heptachlor Epoxide			0.05 U			0.05 U	9 U	0.52 (r)	0.0038 (r)	0.053 (r)	0.0036 (r)
Endosulfan I			0.05 U			0.05 U	9 U	0.22 (s)	0.056 (s)	0.034 (s)	0.0087 (s)
Dieldrin			0.1 U			0.1 U	18 U	2.5	0.0019	0.71	0.0019
4,4'-DDE			0.1 U			0.1 U	18 U	1,050 *	0.001 (u)	14 *	0.001 (u)
Endrin			0.1 U			0.1 U	18 U	0.18 (t)	0.0023 (t)	0.037 (t)	0.0023 (t)
Endosulfan II			0.1 U			0.1 U	18 U	0.22 (s)	0.056 (s)	0.034 (s)	0.0087 (s)
4,4'-DDD			0.1 U			0.1 U	18 U	0.6 *	0.001 (u)	3.6 *	0.001 (u)
Endosulfan Sulfate			0.1 U			0.1 U	18 U	0.22 (s)	0.056 (s)	0.034 (s)	0.0087 (s)
4,4'-DDT			0.1 U			0.1 U	18 U	1.1 (u)	0.001 (u)	0.13 (u)	0.001 (u)
Methoxychlor			0.5 U			0.5 U	90 U		0.03		0.03
Endrin Ketone			0.1 U			0.1 U	18 U	0.18 (t)	0.0023 (t)	0.037 (t)	0.0023 (t)
Endrin Aldehyde			0.1 U			0.1 U	18 U				
alpha-Chlordane			0.05 U			0.05 U	9 U	2.4 (v)	0.0043 (v)	0.09 (v)	0.0040 (v)
gamma-Chlordane			0.05 U			0.05 U	9 U	2.4 (v)	0.0043 (v)	0.09 (v)	0.0040 (v)
Toxaphene			5 U			5 U	900 U	0.73	0.0002	0.21	0.0002
Aroclor-1016			1 U			1 U	180 U	2.0 (w)	0.014 (w)	10 (w)	0.030 (w)
Aroclor-1221			2 U			2 U	360 U	2.0 (w)	0.014 (w)	10 (w)	0.030 (w)
Aroclor-1232			1 U			1 U	180 U	2.0 (w)	0.014 (w)	10 (w)	0.030 (w)
Aroclor-1242			1 U			1 U	180 U	2.0 (w)	0.014 (w)	10 (w)	0.030 (w)
Aroclor-1248			1 U			1 U	180 U	2.0 (w)	0.014 (w)	10 (w)	0.030 (w)
Aroclor-1254			1 U			1 U	180 U	2.0 (w)	0.014 (w)	10 (w)	0.030 (w)
Aroclor-1260			1 U			1 U	180 U	2.0 (w)	0.014 (w)	10 (w)	0.030 (w)
Metals							mg/Kg-dr				
Antimony			30 U			30 U	3.7 PN	9,000 *	1,600 *		
Arsenic			1.5 U			1.5 U	12.5				
Beryllium			1 U			1 U	0.26 P	130 *	5.3 *		
Cadmium			0.49 P			0.31 P	1.3 P	3.9 +	1.1 +	43	9.3
Chromium			5 U			5 U	44.8				
Copper			102			15	122	18 +	12 +	2.9	
Lead			6.4			1 U	48.8	82 +	3.2 +	140	5.6
Mercury			0.32 PN			0.05 UN	0.127 N	2.4	0.012	2.1	0.025
Nickel			10 U			10 U	42.6	1,418 +	158 +	75	8.3
Selenium			4.8 PN			2 UN	0.6 N	260	35	410	54
Silver			7.08			1.34	3.65 N	4.1 +	0.12	2.3	
Thallium			2.5 U			2.5 U	--- U	1,400 *	40 *	2,130 *	
Zinc			113			14 P	240	117 +	106 +	95	86

[1]NOTE: SOME INDIVIDUAL COMPOUND CRITERIA OR LOELS MAY NOT AGREE WITH GROUP CRITERIA OR LOELS. REFER TO APPROPRIATE EPA DOCUMENT ON AMBIENT WATER QUALITY CRITERIA FOR FULL DISCUSSION.

U The analyte was not detected at or above the reported result.
J The analyte was positively identified. The associated numerical result is an estimate.
N For organic analytes there is evidence the analyte is present in this sample.
For metals analytes the spike sample recovery is not within control limits.
NJ There is evidence that the analyte is present. The associated numerical result is an estimate.
P The analyte was detected above the instrument detection limit but below the established quantification limit.

* Insufficient data to develop criteria. Value presented is the LOEL.
** pH dependent criteria (7.8 pH used).
\+ Hardness dependent criteria (100 mg/L used).

Appendix B (cont.) – VOA, BNA, Pesticide/PCB and Metals Scan Results – Snohomish, September 1992.

a	Total Halomethanes
b	Total Dichloroethenes
c	Total Trichloroethanes
d	Total Dichloropropanes
e	Total Dichloropropenes
f	Total Tetrachloroethanes
g	Total Chlorinated Benzenes (excluding Dichlorobenzenes)
h	Total Dichlorobenzenes
i	Total Phthalate Esters
j	Total Chloroalkyl Ethers
k	Total Nitrosamines
l	Total Nitrophenols
m	Total Chlorinated Naphthalenes
n	Total Polynuclear Aromatic Hydrocarbons
o	Total Dinitrotoluenes
p	Total Haloethers
q	Total BHCs
r	Heptachlor
s	Endosulfan
t	Endrin
u	DDT plus metabolites
v	Total Chlordane
w	Total Aroclors (PCBs)

Priority Pollutants Not On List:
Asbestos
Cyanide
Dimethylnitrosamine
Acrylonitrile
Acrolein
TCDD (Dioxin)

APPENDIX C

ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 398155

Lab ID: B792C
Matrix: Waters

QC Report No: B792-WDOE
Project No: Snohomish STP
Date Received: 09/23/92

Data Release Authorized:
Report prepared: 10/21/92 - MAC:C pat

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)	
1	-	Unknown (bp m/e 45)	VOA	251	36 J	NJ KF
2	-	Unknown (bp m/e 45)	"	290	9 J	
3	-	Unknown (bp m/e 57)	"	801	12 J	
4	-	Siloxane Isomer (bp m/e 281)	"	882	12 J	
5	-	Siloxane Isomer (bp m/e 73)	"	1055	11 J	
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9						
10						
11						
12						
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ANALYTICAL
RESOURCES
INCORPORATED

Analytical
Chemists &
Consultants

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Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 398156

Lab ID: B792D
Matrix: Waters

QC Report No: B792-WDOE
Project No: Snohomish STP
Date Received: 09/23/92

Data Release Authorized:
Report prepared: 10/21/92 - MAC:C pat

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	Unknown (bp m/e 45)	VOA	250	35 J NJ KF
2	62016-14-2	Octane, 2,5,6-Trimethyl-	"	889	11 J
3	-	Unknown Hydrocarbon (bp m/e 57)	"	960	18 J
4	-	Unknown Hydrocarbon (bp m/e 57)	"	990	18 J
5	-	Unknown Hydrocarbon (bp m/e 57)	"	1015	37 J
6	-	C10 H16 Isomer (bp m/e 68)	"	1029	20 J
7	-	Unknown Hydrocarbon (bp m/e 57)	"	1037	10 J
8	-	Unknown Hydrocarbon (bp m/e 57)	"	1055	23 J
9	-	Unknown Hydrocarbon (bp m/e 57)	"	1073	11 J
10	-	Unknown Hydrocarbon (bp m/e 57)	"	1112	18 J
11					
12					
13					
14					
15					
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17					
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333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 398163

Lab ID: B792E
Matrix: Waters

QC Report No: B792-WDOE
Project No: Snohomish STP
Date Received: 09/23/92

Data Release Authorized: Donna B. Patton
Report prepared: 10/21/92 - MAC:C pat

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	Siloxane Isomer (bp m/e 281)	VOA	881	48 J NJ KF
2	541-02-6	Cyclopentasiloxane, Decamethyl-	"	1054	26 J NJ KF
3					
4					
5					
6					
7					
8					
9					
10					
11					
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ANALYTICAL RESOURCES INCORPORATED

Analytical
Chemists &
Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 398172

Lab ID: B792GRE
Matrix: Soils

QC Report No: B792-WDOE
Project No: Snohomish STP
Date Received: 09/23/92

Data Release Authorized:
Report prepared: 10/21/92 - MAC:C pat

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/kg)
1	-	Unknown Hydrocarbon (bp m/e 57)	VOA	892	250 J NJ KF
2	-	Unknown Hydrocarbon (bp m/e 57)	"	963	770 J
3	-	Unknown Hydrocarbon (bp m/e 57)	"	993	1000 J
4	-	Unknown Hydrocarbon (bp m/e 57)	"	1019	1700 J
5	-	Unknown Hydrocarbon (bp m/e 57)	"	1041	490 J
6	-	Unknown (bp m/e 73)	"	1059	380 J
7	-	Unknown Hydrocarbon (bp m/e 71)	"	1065	230 J
8	-	Unknown Hydrocarbon (bp m/e 57)	"	1077	780 J
9	-	Unknown Hydrocarbon (bp m/e 57)	"	1096	290 J
10	-	Unknown Hydrocarbon (bp m/e 57)	"	1116	1100 J
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ANALYTICAL RESOURCES INCORPORATED

Analytical Chemists & Consultants

333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 398157

Lab ID: B792Are
Matrix: Water

QC Report No: B792 - WDOE
Project No: Snohomish STP
VTSR: 09/23/92

Data Release Authorized: _____
Report Prepared: *10/20/92 MAC:D sk*

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	Unknown (bp m/e 57)	ABN	355	46 J NJ KF
2	-	C8.H18.O3 Isomer (bp m/e 45)	ABN	761	280 J
3	-	Unknown (bp m/e 45)	ABN	835	21 J
4	124-17-4	Ethanol, 2-(2-Butoxyethoxy)-, Acetate	ABN	947	37 J
5	-	Unknown (bp m/e 58)	ABN	1086	14 J
6	-	Unknown Alcohol Type (bp m/e 43)	ABN	1147	30 J
7	-	Unknown Alcohol Type (bp m/e 43)	ABN	1237	12 J
8	-	Unknown Alcohol Type (bp m/e 43)	ABN	1324	36 J
9	58-08-2	1H-Purine-2,6-Dione, 3,7-Dihydro-1,3,7-Trimethyl-	ABN	1378	13 J
10	-	Unknown Acid Type (bp m/e 43)	ABN	1394	10 J
11	-	Unknown (bp m/e 43)	ABN	1405	25 J
12	-	Unknown (bp m/e 43)	ABN	1490	210 J
13	-	Unknown (bp m/e 43)	ABN	1557	20 J
14	-	Unknown (bp m/e 55)	ABN	1616	1600 J
15	-	Unknown (bp m/e 43)	ABN	1633	880 J
16	78-51-3	Ethanol, 2-Butoxy-, Phosphate (3:1)	ABN	1780	110 J
17	-	Unknown (bp m/e 69)	ABN	2019	290 J
18	-	(C27.H48.O) Cholestanol Isomer (bp m/e 43)	ABN	2153	290 J
19	57-88-5	Cholest-5-en-3-ol (3.Beta.)-	ABN	2174	290 J
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333 Ninth Ave. North
Seattle, WA 98109-5187
(206) 621-6490
(206) 621-7523 (FAX)

ORGANIC ANALYSIS DATA SHEET - Tentatively Identified Compounds

Sample No: 398168

Lab ID: B792B
Matrix: Water

QC Report No: B792 - WDOE
Project No: Snohomish STP
VTSR: 09/23/92

Data Release Authorized: _____
Report Prepared: *10/23/92 MAC:D sk*

	CAS Number	Compound Name	Fraction	Scan Number	Estimated Concentration (µg/L)
1	-	Unknown (bp m/e 45)	ABN	525	4 J NJ
2	-	Butoxyethanol Isomer (bp m/e 45)	ABN	750	58 J
3	544-63-8	Tetradecanoic Acid	ABN	1310	8 J
4	-	Unknown Acid Type (bp m/e 43)	ABN	1361	4 J
5	-	Unknown Acid Type (bp m/e 43)	ABN	1390	7 J
6	-	Unknown (bp m/e 41)	ABN	1458	110 J
7	-	Unknown Acid Type (bp m/e 43)	ABN	1474	52 J
8	-	Unknown (bp m/e 41)	ABN	1525	10 J
9	150-86-7	2- Hexadecen-1-ol, 3,7,11,15-Tetramethyl-, (R-(R,R-(E)))-	ABN	1578	4 J
10	-	Unknown (bp m/e 41)	ABN	1602	140 J
11	-	Unknown Acid Type (bp m/e 43)	ABN	1614	10 J
12	-	Unknown (bp m/e 57)	ABN	2000	4 J
13	-	Unknown (bp m/e 69)	ABN	2018	8 J
14	-	(C27.H48.O) Cholestanol Isomer (bp m/e 43)	ABN	2152	12 J
15	57-88-5	Cholest-5-en-3-ol (3.Beta.)-	ABN	2172	16 J
16	-	(C27.H48.O) Cholestanol Isomer (bp m/e 55)	ABN	2176	5 J
17	-	C28.H48.O Isomer (bp m/e 43)	ABN	2205	5 J
18	-	Unknown Alcohol Type (bp m/e 43)	ABN	2224	5 J
19	-	(C29.H48.O) Stigmastadienol Isomer (bp m/e 55)	ABN	2239	4 J
20	-	(C29.H50.O) Stimastenol Isomer (bp m/e 43)	ABN	2262	8 J
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